

Remarks/ Arguments

Claims 1 to 24 are pending in this patent application. Claims 1, 4, 8, 11, 12, 15 to 17, and 21 to 23 have been amended, without prejudice. Claim 18 has been canceled, without prejudice.

The Action includes rejections under 35 U.S.C. §§ 103(a) and 112, second paragraph. In view of the foregoing amendments and the following remarks, reconsideration and withdrawal of the rejections are requested respectfully.

Discussion of the Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 1 to 24 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as their invention. For the reasons detailed below, Applicants respectfully traverse this rejection.

Claims 1, 4, 8, 11, 15 to 17, 22, and 23 were rejected as indefinite because the phrase "selected from" was allegedly unclear. Although Applicants disagree respectfully that such phrase is unclear, Applicants have amended the claims so the disputed phrase now reads "selected from the group consisting of" as suggested by the Examiner. Accordingly, Applicants submit that this rejection is now moot.

Claims 3, 5, 6, 9, and 10 were rejected as indefinite because Applicants allegedly failed to specify bases for the claimed weight percent. Applicants disagree respectfully.

Indeed, acceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed, in light of the specification" (MPEP at 2100-208 Rev. 2, May 2004). The burden is on the Office to provide evidence or technical reasoning to support a contention that one of ordinary skill in the art would not be able to understand the meaning of the claim terms. MPEP § 2173.02. The standard to apply is whether the claims

“define the patentable subject matter with a reasonable degree of particularity and distinctness” (id. at 2100-208 Rev. 2, May 2004) (emphasis in the original).

Applicants’ specification clearly establishes the bases for the claimed weight percents. For example, Applicants’ specification at page 6, lines 22 to 24, states:

[t]he amount of at least one diisocyanate within the isocyanate terminated prepolymer may range from about 20% to about 30% by weight of the reaction mixture (excluding solvent if present).

Thus, when the instant claims are read in light of the specification as they should be, one skilled in the art would indeed understand the bases for the claimed weight percents. *In re Cohn*, 169 USPQ 95 (C.C.P.A. 1971) (the claims must be read in light of the specification).

Claim 4 is rejected as indefinite because the term “derivatives” is allegedly unclear. Although Applicants disagree respectfully that such term renders claim 4 indefinite, Applicants have deleted the term in an effort to advance prosecution of the present patent application. Accordingly, the rejection is moot.

Claim 8 is rejected as allegedly indefinite. Applicants submit respectfully that this rejection is moot in view of the foregoing amendments.

Claim 12 is rejected as indefinite because the phrase “the first reacting step” allegedly lacks antecedent basis. Applicants submit respectfully that this rejection is moot in view of the foregoing amendments.

Claim 19 is rejected as indefinite because it is allegedly unclear what degree of crystallinity may be present and still satisfy the language “substantially free”. Acceptability of the claim language, however, depends on whether one of ordinary skill in the art would understand what is claimed, in light of the specification” (MPEP at 2100-208 Rev. 2, May 2004). The burden is on the Office to provide evidence or technical reasoning to support a contention that one of ordinary skill in the art would not be able to understand the meaning of the claim terms. MPEP § 2173.02. The standard to apply is whether the claims “define the

patentable subject matter with a reasonable degree of particularity and distinctness” (id. at 2100-208 Rev. 2, May 2004) (emphasis in the original). Applicants’ specification at, *e.g.*, page 22 and Figure 2 provide the guidance to one of ordinary skill in the art to determine what degree of crystallinity may be present and still satisfy the language “substantially free”. Indeed, from such teachings, one skilled in the art would know how to use a differential scanning calorimeter to measure thermal transitions related to crystallinity to determine whether a polymer is “substantially” free of crystallinity. Accordingly, reconsideration and withdrawal of the rejection is requested respectfully.

Discussion of the Rejection Under 35 U.S.C. § 103(a)

Claims 1 to 24 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. patent application Publication No. US 2003/0083457 to Schafheutle et al. (“the 457 publication”) in view of U.S. Patent No. 6,515,070 to Kobylanska et al. (“the 070 patent”), U.S. Patent No. 5,354,807 to Dochniak et al. (“the 807 patent”), U.S. Patent No. 5,270,433 to Klauck et al. (“the 433 patent”), U.S. Patent No. 5,576,382 to Seneker et al. (“the 382 patent”), and U.S. Patent No. 4,855,077 to Shikinami et al. (“the 077 patent”). Applicants respectfully traverse this rejection as one of ordinary skill in the art at the time of the present invention would not have been motivated to combine the cited references in such a way that would produce Applicants’ claimed invention.

To establish a *prima facie* case of obviousness, however, “there must be some teaching, suggestion or motivation in the prior art to make the specific combination that was made by the applicant.” *In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998). “In other words, the examiner must show reasons that the skilled artisan, confronted with the same problem as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the

manner claimed.” *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1458 (Fed. Cir. 1998).

Applicants’ Claimed Invention

Applicants’ claimed invention defines a process for forming an aqueous polyurethane dispersion, the process comprising the steps of providing an isocyanate terminated prepolymer by reacting (i) at least one diisocyanate comprising $\alpha,\alpha,\alpha,\alpha$ -tetramethylxylene diisocyanate, (ii) at least one difunctional polyol comprising polypropylene glycol, and (iii) at least one isocyanate reactive compound comprising an acid functional group and at least two isocyanate reactive groups selected from the group consisting of a hydroxy, a primary amino, a secondary amino, and combinations thereof; neutralizing the isocyanate reactive compound (iii) with a neutralizing agent comprising an amine group; reacting the isocyanate terminated prepolymer with at least one chain terminating agent; dispersing the isocyanate terminated prepolymer in water; and reacting the isocyanate terminated prepolymer with at least one chain extending agent comprising an organic diamine, ***wherein the polyurethane polymer has a weight average molecular weight ranging from 20,000 to 80,000 (see, e.g., claim 1).***

The 457 Publication

The 457 publication discloses an aqueous dispersion comprising a ***high*** molar mass polyurethane A and also additives B selected from mercaptans, hydrazides, and N-alkylamides. According to the 457 publication, particularly suitable additives B of this kind contain two of the reactive groups mentioned; that is, two groups selected from hydrazide groups, mercaptan groups, and N-alkylamide groups. It is preferred for one molecule to contain two identical reactive groups, viz dihydrazides, dimercaptans, and bis(N-alkylamides). The polyurethanes of the 457 have a “high molar mass” defined as having a

weight-average molar mass M_w of **at least 20 kg/mol**, preferably **at least 30** and with particular preference **at least 40 kg/mol**.

The Differences Between Applicants' Claimed Invention and the 457 Publication

The differences between Applicants' claimed invention and the 457 publication are significant. In this regard, Applicants' claimed invention defines a polyurethane polymer having a weight average molecular weight ranging from **20,000 to 80,000**. Applicants have found that this molecular weight is ideally suited for use as a lamination adhesive for electronic devices because it coats an uneven electronic substrate; higher molecular weight polyurethanes leave voids over such pores and gaps where the adhesive is not in direct physical contact with the substrate.

Moreover, Applicants have discovered that the claimed sequence of steps is critical in achieving the claimed molecular weight range. For example, Applicants' process recites the step of reacting the isocyanate terminated prepolymer with at least one chain terminating agent **before** the isocyanate terminated prepolymer is dispersed in water. The 457 publication, in contrast, teaches that the chain terminating agent is added after the prepolymer is dispersed in water:

at least partial neutralization of the group in the compound AD that is capable of forming anions, to form anionic groups, **dispersion of this prepolymer in water**, and

reaction of the neutralized prepolymer with at least one of the components selected from low molecular weight polyols AE which carry no further isocyanate-reactive groups

...

(the 457 publication at paragraphs [0014] and [0015]) (emphasis added). Applicants note that paragraph [0036] of the 457 publication confirms that the component referred to as "AE" is a chain terminating agent.

There is No Motivation to Modify the 457 Publication in a Way that would Obtain Applicants' Claimed Invention

The Action fails to provide any reason why a person of ordinary skill in the art having the 457 publication before him would have been motivated to produce Applicants claimed polyurethane having the recited molecular weight range (*i.e.*, 20,000 to 80,000). Although the 457 publication discloses that its polyurethanes have **minimum** molecular weight within this range, the 457 publication does not disclose the desirability an upper limit, let alone an upper limit of 80,000.

Moreover, there is no reason why a person of ordinary skill in the art having the 457 publication before him would have been motivated to carry out the instantly claimed sequence. To the extent that motivation is alleged, the Action attributes the motivation to Applicants' own disclosure. In this regard, the Action asserts that Applicants' disclosure teaches that "there is latitude with respect to the sequence of neutralization, chain termination, dispersion, and chain extension" (Action at 3). This is demonstrably incorrect because Applicants' disclosure plainly teaches that the sequence of steps **within each stage** of the two-stage process can be performed in a variety of sequences.

In this regard, Applicants' specification teaches that the aqueous polyurethane dispersion is made in **two stages**: the prepolymer formation and the dispersion formation (see, Applicants' specification at paragraph [0015]). In the first stage, an isocyanate terminated prepolymer is prepared by combining chemical reactants including at least one isocyanate reactive compound capable of imparting some hydrophilicity to the material, neutralizing the isocyanate reactive group with a neutralizing agent having a suitable organic counter ion, and optionally reacting at least a portion of the isocyanate end groups of the isocyanate terminated prepolymer with a chain terminating agent (*id.*). In the second stage, the aqueous polyurethane dispersion is prepared by dispersing the prepolymer in water to

provide an aqueous-based dispersion, and chain extending the prepolymer with a chain extending agent (id.). Applicants' claimed invention plainly teaches that the sequence of steps ***within each stage*** of the two-stage process can be performed in a variety of sequences:

in alternative embodiments, ***one or more of the above steps of either or both stages may be performed in a variety of different orders or during at least a portion of one or more steps***. In certain instances, for example, the neutralizing step may be conducted during at least a portion of the reacting step, the neutralizing step may be conducted during at least a portion of the dispersing step, or the reacting step may be conducted during at least a portion of the chain extending steps, and variations thereof

(id.) (emphasis added).

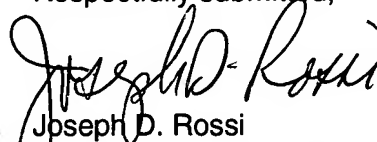
In the process of Applicants' claimed invention, the ***chain terminating step*** is part of the ***first stage***, whereas the ***aqueous-based dispersion*** is prepared in the ***second stage***. Because Applicants' specification does not teach that ***any*** of the steps can be performed at ***any*** point of the process, Applicants' specification is ***incapable*** of providing the motivation to modify the 457 publication in such a way that would add the chain terminating agent ***after*** the prepolymer is dispersed in water (*i.e.*, in the second stage ***instead*** of the first stage). Since no other motivation is provided in the Action for performing Applicants' claimed sequence, the rejection is improper. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are requested respectfully.

Conclusion

Applicants believe that the foregoing constitutes a complete and full response to the Action of record. Applicants respectfully submit that this application is now in condition for allowance. Accordingly, an indication of allowability and an early Notice of Allowance are respectfully requested.

The Commissioner is hereby authorized to charge the fee required and any additional fees that may be needed to Deposit Account No. 01-0493 in the name of Air Products and Chemicals, Inc.

Respectfully submitted,


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